RESEARCH PROJECT SEGMENT

State: Alaska

Project No.: F-9-4 *Name:* Sport Fish Investigations of Alaska.

Study No.: G-II *Study Title:* Sport Fish Studies.

Job No.: G-II-C *Job Title:* Population Studies of Anadromous Fish Populations - Southwestern Kenai Peninsula and Kachemak Bay.

Period Covered: July 1, 1971 to June 30, 1972.

ABSTRACT

A creel census conducted on three lower Kenai Peninsula streams during the king salmon, Oncorhynchus tshawytscha, punch-card fishery resulted in an observed catch of 69 fish over 20 inches (50.8 cm) in length. The observed and punch-card reported harvest was projected for a total catch of 237 king salmon, 57.8% of which were taken from the Ninilchik River. Angler effort was estimated at 7,950 man-days during the six-day fishery.

Punch-card returnees reported a harvest of 545 king salmon from the Kenai River. This is an increase of 130.0% over the 1970 harvest of 237 fish. The peak of the fishery occurred between July 25 and July 31 when 24.0% of the catch was taken.

In 1971 a punch-card was required for taking king salmon in salt water. Punch-card returns indicated a harvest of 191 fish, 73.3% of which were caught in the Deep Creek area. The peak of the fishery occurred between July 11 and July 17 when 39.8% of the catch was harvested.

Age groups 1.4 and 1.3 dominated the Ninilchik River harvest contributing 57.1 and 34.3% of the catch, respectively.

Adverse weather conditions prevented aerial surveys of lower Kenai Peninsula streams. A foot survey of the Anchor River revealed 279 fish in the index area. This data was projected for an estimated escapement of 1,220 king salmon.

RECOMMENDATIONS

It is recommended that this project be discontinued. Data indicates lower Kenai Peninsula king salmon populations, as well as angler harvest and effort, have stabilized and intensive investigations are not necessary at the present time.

OBJECTIVES

1. To determine the sport catch of anadromous fishes, with major emphasis on king salmon, and to evaluate angling pressure on the freshwaters of the southwestern Kenai Peninsula.

2. To evaluate population trends for king salmon in the major recreational fishing waters of the southwestern Kenai Peninsula.

3. To determine migration patterns of silver salmon entering the Mud Bay area of Kachemak Bay.

4. To evaluate and develop plans for the enhancement of anadromous fish stocks, to provide recommendations for their management, and to direct the course of future studies.

TECHNIQUES USED

Creel census techniques of the Kenai Peninsula king salmon punch-card fishery have been previously described by Engel (1967).

King salmon escapement was estimated by foot surveys and has been previously described by Logan (1964) and Engel (1965).

Scale samples were collected from sport-caught adult king salmon, impressed on cellulose acetate, and examined by microprojector for age determination.

FINDINGS

Information pertinent to this project and a description of the area are presented in Dingell-Johnson Progress Reports by Dunn (1961); Logan (1962, 1963, 1964); Engel (1965, 1966, 1967); Redick (1968); McHenry (1969); Watsjold (1970); and Nelson (1971).

In 1966 a quota of 500 king salmon, Oncorhynchus tshawytscha, over 20 inches (50.8 cm) in length was established by the Alaska Board of Fish and Game for the Kenai Peninsula. This quota was continued in 1967 and 1968. In view of the low 1968 escapement, the 1969 quota was reduced to 200 fish. This quota remained in effect through 1970. The quota system was discontinued in 1971 as data indicated the stocks could not be effectively managed within these limitations. The 1971 season on lower Kenai Peninsula streams was open for two consecutive weekends, May 29-30 and June 5-6. Due to a relatively low catch during this period, Anchor River and Deep Creek were opened by emergency order for an additional weekend, June 12-13.

The Kenai River king salmon fishery was continuous from May 30 through July 31. The area open to fishing was from the mouth upstream to Skilak Lake, except in a closed area extending 300 yards downstream from the confluence of the Funny River.

In 1971 a punch card was required for taking king salmon in saltwater. The areas open to king salmon fishing were Cook Inlet and contiguous bays south of the Forelands. The season was continuous from January 1 through July 31.

King Salmon Studies

Harvest:

A creel census was conducted on Deep Creek and the Anchor and Ninilchik rivers to monitor the harvest. Census information collected during the two scheduled weekends of the fishery revealed that 52 king salmon were caught, 44 (84.6%) from the Ninilchik River. The Anchor River and Deep Creek were opened by field announcement during the weekend of June 12-13. An additional harvest of 17 fish was observed during this period.

Table 1 presents the creel checked and total reported king salmon on three lower Kenai Peninsula streams. The reported harvest was computed by adding the number of fish creel checked to the number of fish not creel checked but reported by punch-card returnees. As has occurrred since 1969, the Ninilchik River accounted for the majority of the harvest (57.8%) while the Anchor River and Deep Creek contributed 24.5 and 17.7%, respectively.

TABLE 1 Observed and (Known)* King Salmon Harvest and Distribution of Three Lower Kenai Peninsula Streams, 1971.

Date	Anchor River	Ninilchik River	Deep Creek	Cumulative Totals
5/29/71	4 (5)	11 (18)	1 (3)	16 (26)
5/30/71	0 (5)	1 (14)	0 (1)	1 (20)
6/ 5/71	3 (3)	15 (29)	0 (3)	18 (35)
6/ 6/71	0 (3)	17 (24)	0 (0)	17 (27)
6/12/71	7 (11)	No Fishery	3 (11)	10 (22)
6/13/71	4 (9)	No Fishery	3 (8)	7 (17)
Total	18 (36)	44 (85)	7 (26)	69 (147)

*Punch-card reported harvest.

Stream conditions are closely correlated with angler success. Anchor River and Deep Creek were high and turbid during the fishery while Ninilchik River was relatively low and clear. Much of the expected angler pressure on the Anchor River and Deep Creek was diverted for this reason.

Table 2 indicates a gradual shift in the percent of annual harvest from the Anchor to the Ninilchik River. This trend continued in 1971. This should not be interpreted as a decline in the Anchor River king salmon population, but as a change in angler preference because of more favorable water conditions (Nelson, 1971).

TABLE 2 Percent Contribution to the Annual King Salmon Harvest of Three Lower Kenai Peninsula Streams, 1966-1971.

Year	Anchor River	Ninilchik River	Deep Creek	Cum. Tot.
1966	51.9	39.4	8.7	100.0
1967	44.1	21.9	34.0	100.0
1968	40.5	33.8	25.7	100.0
1969	33.0	51.3	15.7	100.0
1970	33.7	54.7	11.6	100.0
1971	24.5	57.8	17.7	100.0
1966-1970 Avg.	40.7	40.2	19.1	100.0

A total of 23,419 king salmon punch cards were issued in 1971, representing a 40.3% increase over the 1970 total of 16,687. Of the 23,419 punch cards issued, 10,435 (44.6%) were voluntarily returned. This is a substan-

tial decrease when compared to the 1966-70 average return rate of 74.9% (Table 3).

TABLE 3 Summary of Cook Inlet King Salmon Punch Cards Issued and Returned, 1966-1971.

Year	No. Issued	No. Returned	% Returned
1966	8,853	6,835	77.2
1967	5,977	4,909	82.1
1968	9,524	6,724	70.6
1969	6,680	4,651	69.6
1970	16,687	12,518	75.0
1971	23,419	10,435	44.6
1966-1970 Avg.	9,544	7,127	74.9

The reason for this low return rate is not definitely known, but is probably due to the longer retention of the punch card by anglers. Increased retention of the card may be related to the following: (1) The length of the season on the Kenai River, (2) The length of the saltwater fishery, (3) Variable opening and closing dates of Upper Cook Inlet streams resulted in longer fisheries than in previous years.

Of the 7,388 anglers returning punch cards with information, 3,587 (48.6%) indicated they fished king salmon. Of the anglers that fished king salmon, 73.3% indicated they fished the Kenai Peninsula and reported a success rate of 20.4%, a decrease of 1.1% from 1970 (Table 4). Successful anglers reported a harvest of 545, 191, and 110 king salmon, respectively, from the Kenai River, salt water, and lower Kenai Peninsula streams.

TABLE 4 Summary of Information from Kenai Peninsula King Salmon Punch-Card Returns, 1970-1971.

Year	No. Fished	Successful Anglers	Unsuccessful Anglers	Successful Anglers (%)
1970	2,610	560	2,050	21.5
1971	2,629	537	2,092	20.4

Redick's (1968) ratio was used to estimate the number of fish caught by punch card non-returnees.

Fish Creel Checked	Punch card returned / Punch card not returned	=	Fish not Creel Checked	Punch card returned / Punch card not returned

$$\frac{32}{37} = \frac{78}{x}$$

$$x = 90$$

This ratio estimated a total catch composed of:

Total fish creel checked	69
Punch cards returned, fish not checked	78
Punch cards not returned, fish not checked	90
Total estimated harvest	237

This ratio assumes that the punch card rate of return is the same for anglers whose fish were not creel checked as for those whose fish were creel checked.

Of the estimated total catch the Anchor River, Ninilchik River, and Deep Creek contributed 58, 137 and 42 king salmon, respectively. The total estimated catch per stream was computed by multiplying the streams relative contribution by the 90 unreported fish. This was then added to each stream's known harvest (Nelson, 1970).

Of the total estimated harvest, 69 (29.1%) king salmon were creel checked. Limit catches (two fish per angler) comprised 23.0% of the reported harvest and were taken by 13.0% of the successful anglers (Table 5).

TABLE 5 Summary by Percent of the Total King Salmon Catch Comprising the Season Limit and Percent Successful Anglers Taking the Season Limit of Two Fish Per Angler, 1966-1971.

Year	% Tot. Catch Comprising Limit Catches (2 Fish Per Angler)	% Successful Anglers Taking Season Limit
1966	33.3	21.2
1967	36.1	22.0
1968	38.4	22.1
1969	20.3	11.3
1970	30.0	13.2
1971	23.0	13.0
1966-1970 Avg.	31.6	18.0

Escapement:

Unfavorable weather and stream conditions precluded aerial surveys of lower Kenai Peninsula streams. A foot survey of the Anchor River revealed 279 king salmon in the index area. The estimated total escapement of 1,220 fish was extrapolated using Nelson's (1971) ratio.

$$\frac{\text{Average number of king salmon in the index area 1964-1969}}{\text{Average king salmon escapement 1964-1969}} = \frac{\text{Number king salmon in index area 1971}}{\text{Estimated escapement 1971}}$$

$$\frac{311}{1358} = \frac{279}{x}$$

$$x = 1,220$$

The average number of king salmon in the index area was computed from 1964-1969 as the index area during these years corresponds to the 1971 index area. Data from 1970 was not used as that year's total escapement was estimated using the above ratio. The 1971 estimated escapement represents a decrease of 34.2% as compared to the record 1970 estimated escapement of 1,850 and a 6.6% decrease as compared to the 1960-1970 average escapement of 1,305.

Adding the estimated Anchor River sport harvest of 58 fish to the estimated escapement, the total run was estimated at 1,275 king salmon. No carcasses were observed during the foot survey and an insufficient number of sport-caught fish (18) were examined to derive the sex ratio representative of the population. Utilizing the 1960-1969 average male-to-female ratio of 1.1:1 (Table 6), 581 female king salmon spawned in 1971.

TABLE 6 Summary of Escapement, Sex Ratios and Estimated Number of Spawning Female King Salmon, Anchor River, 1960-1971.

Year	Estimated Tot. Escapement	Male:Female Sex Ratio	Estimated Spawning Females	Method of Determination
1960	1,200	0.9:1	631	Aerial & foot survey
1961	850	1.2:1	386	Aerial & foot survey
1962	970	0.8:1	539	Aerial & foot survey
1963	1,340	1.0:1	670	Aerial & foot survey
1964	1,700	1.4:1	708	Aerial & foot survey
1965	1,600	1.7:1	593	Aerial & foot survey
1966	1,325	0.8:1	736	Foot survey
1967	1,195	0.7:1	700	Aerial & foot survey
1968	530	1.7:1	195	Aerial & foot survey
1969	1,800	1.5:1	720	Aerial & foot survey
1970	1,850	0.9:1	974	Foot survey
1971	1,220	---	581	Foot survey
1960-1970 Avg.	1,305	1.1:1	623	

TABLE 7 Summary of Length Frequencies, Sample Sizes and Mean Length of King Salmon, Ninilchik River, 1964-1971.

Year	Length (cm) 0-50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	Tot. Fish	Avg. Length
1964 - Male	6	-	1	6	5	7	-	4	7	5	4	4	7	1	-	-	57	80.5
Female	-	-	-	-	-	-	1	16	12	11	3	-	-	-	-	-	43	86.9
Combined	6	-	1	6	5	7	1	20	19	16	7	4	7	1	-	-	100	83.3
1965 - Male	5	1	-	4	2	-	-	3	7	5	7	6	3	1	2	-	46	84.9
Female	-	-	-	-	-	-	2	9	15	12	7	2	-	-	-	-	47	89.3
Combined	5	1	-	4	2	-	2	12	22	17	14	8	3	1	2	-	93	87.1
1966 - Male	-	1	9	12	3	-	3	7	8	8	4	1	1	2	-	-	59	77.8
Female	-	-	-	-	-	1	3	12	12	14	7	2	-	-	-	-	51	88.3
Combined	-	1	9	12	3	1	6	19	20	22	11	3	1	2	-	-	110	82.7
1967 - Male	2	2	3	-	1	1	1	4	3	4	2	5	4	1	-	-	33	80.4
Female	-	-	-	-	-	-	4	6	8	11	13	6	1	-	-	-	49	91.4
Combined	2	2	3	-	1	1	5	10	11	15	15	11	5	1	-	-	82	87.0
1968 - Male	5	-	5	30	14	-	2	-	4	3	1	3	1	-	-	-	68	67.4
Female	-	-	-	-	1	1	-	2	12	12	11	1	-	-	-	-	40	90.9
Combined	5	-	5	30	15	1	2	2	16	15	12	4	1	-	-	-	108	76.1
1969 - Male	12	7	14	20	17	5	6	10	11	14	8	5	-	-	-	-	129	71.6
Female	-	-	-	-	2	-	3	24	18	10	9	1	-	1	-	-	68	87.1
Combined	12	7	14	20	19	5	9	34	29	24	17	6	-	1	-	-	197	76.9
1970 - Male	6	7	3	10	6	2	1	5	6	8	6	4	4	-	-	1	69	81.5
Female	-	-	-	-	-	-	6	12	15	14	6	4	1	-	-	-	58	88.2
Combined	6	7	3	10	6	2	7	17	21	22	12	8	5	-	-	1	127	84.6
1971 - Male	-	-	-	3	1	-	-	2	-	7	-	1	1	1	-	-	16	87.0
Female	-	-	-	-	-	-	1	2	2	5	7	2	-	-	-	-	19	92.3
Combined	-	-	-	3	1	-	1	4	2	12	7	3	1	1	-	-	35	89.9

Population Structure - Ninilchik River:

Information on the population structure of the Ninilchik River was collected from 35 sport-caught king salmon. Figure 1 presents the length frequency of the sport harvest.

Length frequencies and mean lengths by sex are presented in Table 7. Table 8 summarizes king salmon age group frequency data collected from 1966 through 1971. Table 9 presents the number, percentage, mean fork length and size range for the various age groups. These age groups are not necessarily representative of the total population as the sample is small in relation to the total population and was collected over a relatively short period of time. The dominant age group was 1.4 (57.1%) followed by 1.3 which comprised 34.3% of the sample.

TABLE 8 Age Group Frequency of King Salmon by Percent, Ninilchik River, 1966-1971.

Year	Sample Size	Age Group 1.1	1.2	2.2	1.3	2.3	1.4	2.4	1.5
1966	82	--	22.0	--	45.3	2.2	30.5	--	--
1967	78	2.6	6.4	1.3	30.8	1.3	56.3	--	1.3
1968	100	4.0	42.0	1.0	21.0	1.0	30.0	1.0	--
1969	64	--	34.4	3.1	50.0	--	12.5	--	--
1970	100	--	18.0	--	54.0	--	28.0	--	--
1971	35	--	8.6	--	34.3	--	57.1	--	--

TABLE 9 Number, Percentage, Range, and Mean Fork Length (mm) of King Salmon in Each Age Group, Ninilchik River, 1971.

Age Group	No.	%	Length (mm) Range	Mean
1.2	3	8.6	610 - 630	620
1.3	12	34.3	660 - 925	854
1.4	20	57.1	800 - 1110	967

Population Structure - Anchor River and Deep Creek:

The 18 and 7 fish samples collected at the Anchor River and Deep Creek, respectively, were too small to be representative of the population. Age class frequency and mean size by sex of the Anchor River king salmon samples from 1960 through 1970 are presented in Table 10.

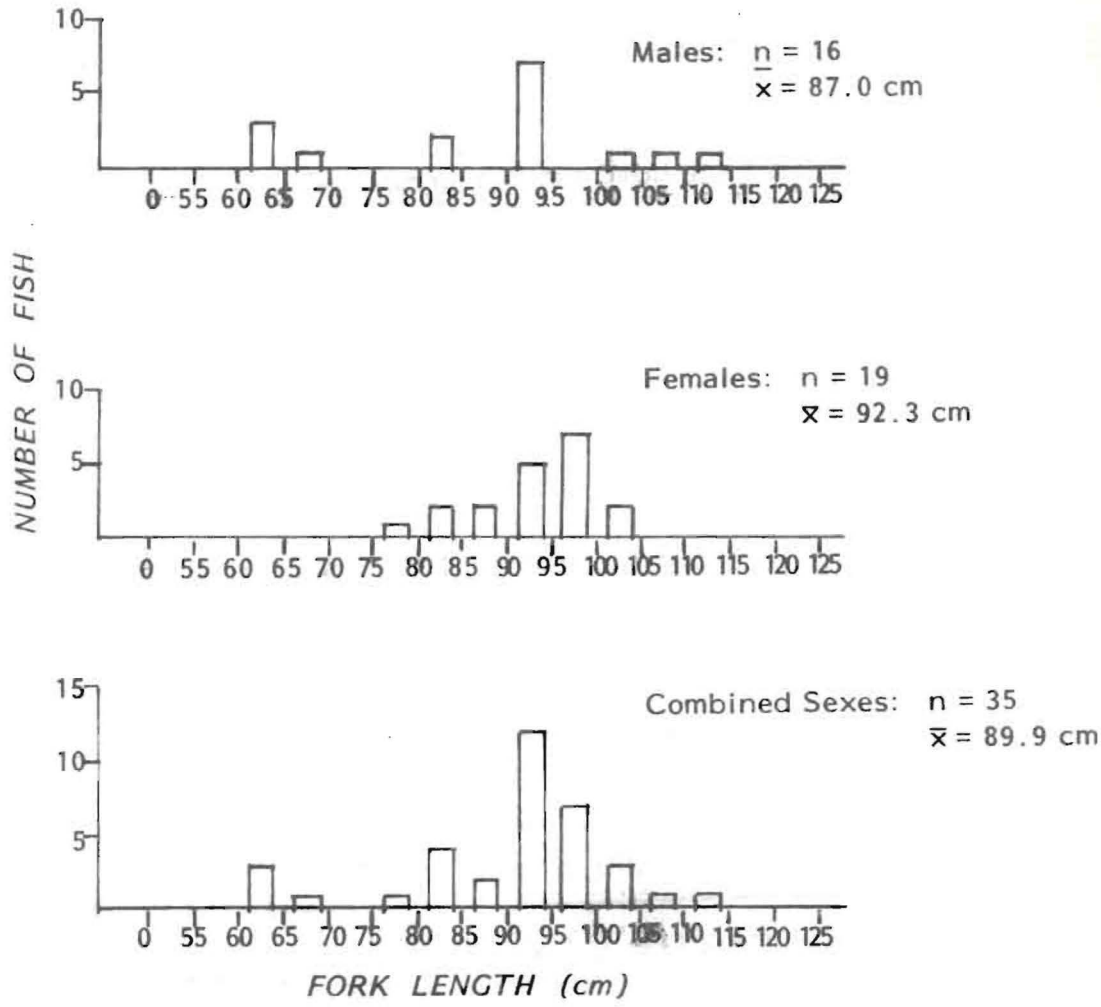

FIGURE 1 LENGTH FREQUENCY OF SPORT-CAUGHT KING SALMON, NINILCHIK RIVER, 1971.

TABLE 10 Age Class Frequency and Mean Sizes by Sex of Anchor River King Salmon Samples, 1960-1970.

Year	Sample Size for Age Determination	Age Group by Percent					Mean Length (cm) and (Number in Sample)		
		1.1	1.2	1.3	1.4	All Other	Male	Female	Combined
1960	199	2.7	6.5	76.0	11.0	3.8	82.3 (88)	82.3 (95)	84.1 (183)
1961	112	2.9	10.6	21.1	64.4	1.0	87.0 (58)	93.8 (49)	90.1 (107)
1962	47	--	31.9	40.4	27.7	--	79.5 (31)	85.9 (40)	83.1 (71)
1963	99	10.1	19.2	49.5	20.2	1.0	71.9 (77)	90.6 (75)	81.1 (152)
1964	--	Carcasses Only - No Sport Fishery					86.1 (60)	91.5 (44)	88.4 (104)
1965	--	Carcasses Only - No Sport Fishery					83.5 (106)	90.7 (62)	86.1 (168)
1966	151	2.6	19.2	42.4	30.5	5.3	77.6 (79)	89.5 (95)	84.1 (174)
1967	112	1.8	8.9	22.3	66.1	0.9	91.8 (97)	94.1 (135)	93.2 (232)
1968	168	0.6	20.8	31.0	46.4	1.2	80.8 (151)	91.7 (116)	85.5 (267)
1969	36	2.8	47.2	38.9	11.1	--	74.8 (102)	89.7 (74)	81.1 (176)
1970	54	--	18.3	54.4	27.3	--	78.8 (31)	90.3 (34)	84.8 (65)
1971*									
1960-1969 Average	115	2.9	20.5	40.2	34.7	1.7	81.5 (85)	90.0 (79)	85.7 (163)

*Sample size was too small to be representative of the population.

Table 11 presents the age group frequency by percent for Deep Creek from 1967 through 1970.

TABLE 11 Age Group Frequency of King Salmon by Percent, Deep Creek, 1967-1971.

Year	Sample Size	Age Group 1.1	2.1	0.2	1.2	2.2	1.3	2.3	1.4	2.4
1967	107	6.5	0.9	0.9	21.6	3.7	29.0	0.9	35.6	0.9
1968	105	2.9	--	--	32.4	3.8	32.4	0.9	26.7	0.9
1969	28	--	--	--	78.6	--	17.8	--	3.6	--
1970	15	--	--	--	20.0	--	46.7	--	33.3	--
1971*										

*Sample size was too small to be representative of the population.

Kenai River King Salmon Fishery:

The Kenai River king salmon harvest has been monitored since 1966 by evaluating punch card returns. During the period 1966-1969 this river was included in the king salmon quota assigned to the Kenai Peninsula by the Alaska Board of Fish and Game. The glacial nature of the river rendered sport fishing difficult and harvest and effort were minimal as anglers concentrated on the more easily fished lower Kenai Peninsula streams.

In 1970, the Alaska Board of Fish and Game exempted the Kenai River from the quota and appreciably extended the season. This resulted in increased pressure and harvest as anglers concentrated their efforts here after the termination of the fishery on lower streams. The harvest as determined by punch-card returns and the fishing periods are presented in Table 12.

TABLE 12 Reported Harvest, Fishing Periods, and King Salmon Per Day, Kenai River, 1966-1971.

Year	Harvest	Fishing Periods	Days of Fishing	Fish/Day
1966	11	5/28-5/30, 6/ 4-6/ 5, 6/11-6/12	7	1.6
1967	7	5/27-5/31	5	1.4
1968	4	5/25-6/ 3	10	0.4
1969	18	7/19-7/27	9	2.0
1970	237	5/30-7/31	63	3.8
1971	545	5/30-7/31	63	8.7

In 1971 the Kenai River king salmon fishery was continuous from May 30 through July 31. The length of the season and the relatively large area open to king salmon fishing precluded a sampling program.

Punch-card returnees reported a harvest of 545 fish with the peak of the catch occurring between July 25 and 31 when 24.0% (131) of the harvest was taken (Table 13). This represents a 130.0% increase over 1970 when returnees reported a harvest of 237 fish with the peak of the fishery occurring between June 20 and 26 when 26.2% (62) of the catch was taken.

TABLE 13 Reported Kenai River King Salmon Harvest by Weekly Periods, May 30-July 31, 1971.

Weekly Period	No. Fish	% Tot. Harvest
5/30 - 6/ 5	4	0.7
6/ 6 - 6/12	6	1.1
6/13 - 6/19	32	5.9
6/20 - 6/26	73	13.4
6/27 - 7/ 3	70	12.8
7/ 4 - 7/10	75	13.8
7/11 - 7/17	54	9.9
7/18 - 7/24	100	18.4
7/25 - 7/31	131	24.0
Total	545	100.0

Of the 414 successful anglers who reported fishing the Kenai River, 131 (31.6%) took the season limit of two king salmon.

Saltwater King Salmon Harvest:

In 1971, a punch card was required to fish king salmon in salt water. The season was continuous from January 1 through July 31. The daily bag limit was two king salmon over 20 inches (50.8 cm) with three in possession. There was no seasonal possession limit and anglers completing the salt water section of their punch card (eight punches) could apply for an additional card.

Punch card returns indicated a total harvest of 191 king salmon. Of the 77 successful anglers, 37 (48.0%) reported taking one king salmon, 16 (20.8%) two, while 24 (31.2%) caught three to eight fish. The peak of the fishery occurred during the week of July 11-17 when 39.8% (76) of the catch was harvested (Table 14). No saltwater harvest was reported prior to May 16.

TABLE 14 Reported Kenai Peninsula Salt Water Harvest by Weekly Periods, May 16 - July 31, 1971.

Weekly Period	No. Fish	% Tot. Harvest
5/16 - 5/22	3	1.6
5/23 - 5/29	2	1.0
5/30 - 6/ 5	1	0.5
6/ 6 - 6/12	12	6.3
6/13 - 6/19	5	2.6
6/20 - 6/26	12	6.3
6/27 - 7/ 3	3	1.6
7/ 4 - 7/10	13	6.8
7/11 - 7/17	76	39.8
7/18 - 7/24	43	22.5
7/25 - 7/31	21	11.0
Total	191	100.0

Deep Creek was the most productive area accounting for 73.3% of the harvest while the Anchor and Ninilchik rivers areas accounted for 6.3 and 4.2%, respectively. One fish was reported taken in Kachemak Bay and no harvest was reported for the western side of Cook Inlet in the Tuxedni Bay area. Some anglers were not specific when indicating the area of their catch and reported taking their fish in "salt water, ocean, or Cook Inlet". These fish represented 15.7% of the reported salt water harvest (Table 15).

TABLE 15 Kenai Peninsula Salt Water Harvest and Distribution, May 16 - July 31, 1971.

Weekly Period	Deep Creek	Anchor River	Ninilchik River	Kachemak Bay	Unspecified	Tot.
5/16 - 5/22	2			1		3
5/23 - 5/29	2					2
5/30 - 6/ 5					1	1
6/ 6 - 6/12	4	6			2	12
6/13 - 6/19	2				3	5
6/20 - 6/26	9		1		2	12
6/27 - 7/ 3		3				3
7/ 4 - 7/10	7				6	13
7/11 - 7/17	59	3	6		8	76
7/18 - 7/24	37				6	43
7/25 - 7/31	18		1		2	21
Total	140	12	8	1	30	191
% Tot. Harvest	73.3	6.3	4.2	0.5	15.7	100.0

King salmon runs in lower Kenai Peninsula streams generally peak in mid-June while the majority of the Kenai River fish arrive in late June or early July. Reference to Figure 2 reveals that the peak of the saltwater harvest occurred during the weekly period of July 11-17 and declined thereafter until the termination of the fishery on July 31. The Kenai River fishery peaked two weeks later with the closing weekly period of July 25-31 being most productive. This tentatively suggests that the stocks harvested during the saltwater fishery were of Kenai River origin.

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King salmon runs in lower Kenai Peninsula streams generally peak in mid-June while the majority of the Kenai River fish arrive in late June or early July. Reference to Figure 2 reveals that the peak of the saltwater harvest occurred during the weekly period of July 11-17 and declined thereafter until the termination of the fishery on July 31. The Kenai River fishery peaked two weeks later with the closing weekly period of July 25-31 being most productive. This tentatively suggests that the stocks harvested during the saltwater fishery were of Kenai River origin.

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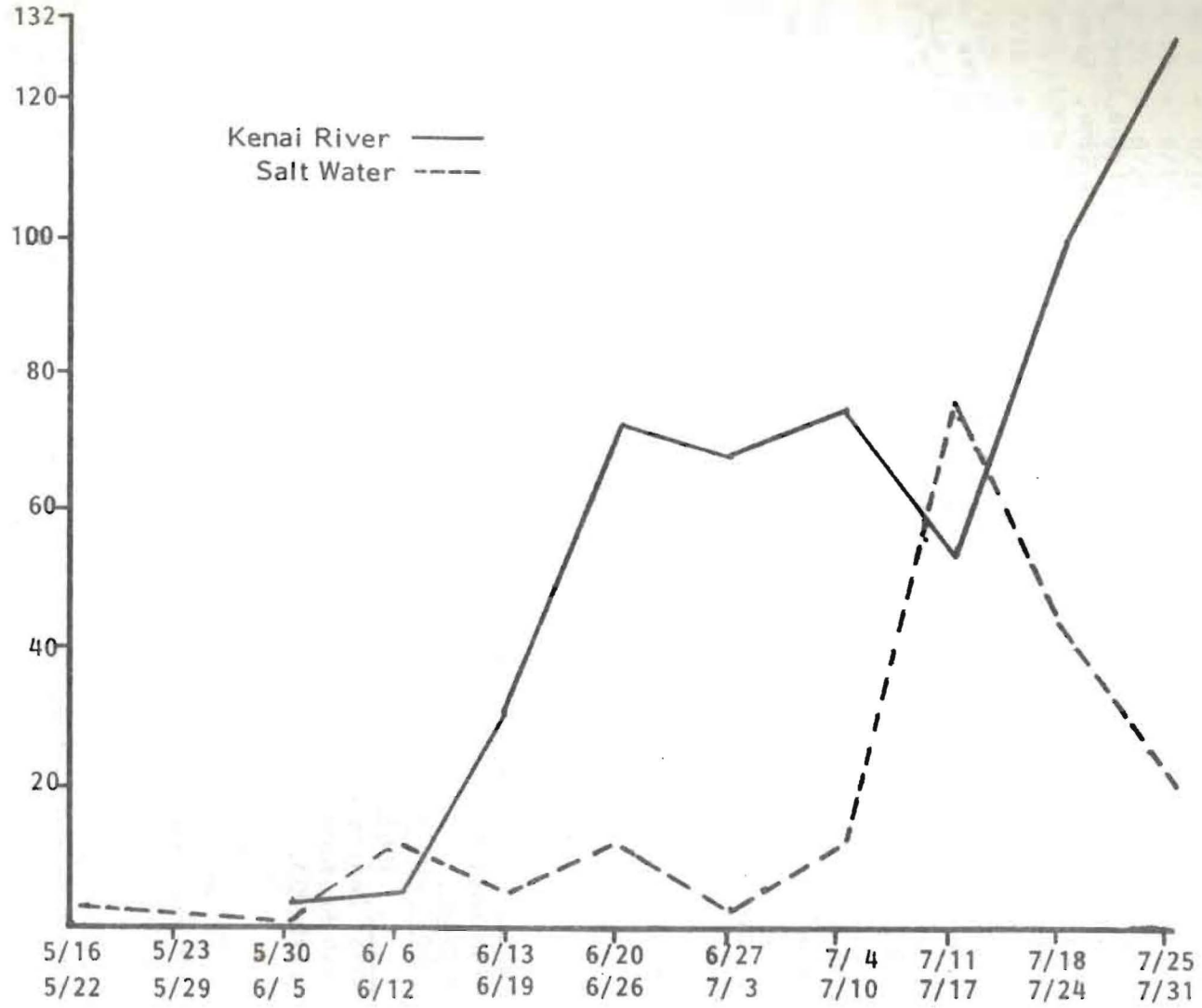

FIGURE 2 KENAI RIVER AND SALT WATER KING SALMON HARVESTS BY WEEKLY PERIODS, 1971.

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